therapeutic range-of-motion exercises. Seating positions and prescriptions must be meticulously analyzed to maintain anatomic alignment and to prevent injury to the insensate limb. The overuse of slings may promote contractures. The use of biofeedback and functional electrical stimulation to shoulder-stabilizing muscles has been reported to decrease the incidence of shoulder subluxation and to promote the recovery of function.

If pain develops in a hemiparetic limb, the clinician must make a definitive diagnosis through a careful examination of the upper limbs. Differentiation should be made between soft tissue injury, reflex sympathetic dystrophy, and subluxation. In subluxation there is a palpable gap between the humeral head and acromion. Bicipital and supraspinatus tendinitis can be diagnosed after determining historically important aggravating factors followed by a thorough examination of the painful region. Brachial plexus injury should be considered in a patient who has atypical return of distal function. Electrodiagnostic studies may help to locate the site of lesion.

The early recognition of reflex sympathetic dystrophy and timely intervention are important to reduce morbidity. Reflex sympathetic dystrophy must be suspected when there is evidence of vasomotor instability, edema of the hand, tenderness over the metacarpophalangeal joints, or dystrophic skin changes. A triple-phase bone scan may show periarticular uptake in the wrist and metacarpophalangeal joints of the involved hand. Management includes range-of-motion exercises, optimal positioning of the upper limb, avoiding painful stimuli, and treating with nonsteroidal anti-inflammatory drugs when there is no medical contraindication. Other modalities, including transcutaneous electrical nerve stimulation or ultrasound therapy, may help to decrease pain and increase sensory feedback during recovery. A short course of oral steroids or the administration of a stellate ganglion block may decrease pain and symptoms. Better results have been reported in patients with positive bone scans who have completed a course of corticosteroids.

Central pain is rare, and the exact pathophysiology remains uncertain. Pain is often burning in character and is associated with an unpleasant sensation of tingling or "pins and needles." Other pain descriptions have been reported. Frequently the pain is spontaneous or evoked by touch. Central pain is difficult to treat. The use of narcotic analgesics frequently provides inadequate relief. Tricyclic antidepressants have been reported to have a beneficial effect. Other treatment alternatives include sympathetic blockade, guanethidine block, and neurosurgical ablative procedures.

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REFERENCES

Faghri PD, Rodgers MM, Glaser RM, Bors JG, Ho C, Akuthota P: The effects of functional electrical stimulation on shoulder subluxation, arm function recovery, and shoulder pain in hemiplegic stroke patients. Arch Phys Med Rehabil 1994; 75:73-79

Joynt RL: The source of shoulder pain in hemiplegia. Arch Phys Med Rehabil 1992; 73:409-413

Kingery WS, Date ES, Bocobo CR: The absence of brachial plexus injury in stroke. Am J Phys Med Rehabil 1993; 72:127-135

Kraft GH, Fitts SS, Hammond MC: Technique to improve function of the arm and hand in chronic hemiplegia. Arch Phys Med Rehabil 1992; 73:220-227

Acute Ankle and Foot Injury—Guidelines for Radiography

IN THIS DECADE of increasing litigation, many clinicians faced with acute ankle and foot trauma automatically take radiographs in search of occult fractures. This practice raises costs and causes substantial delays in care. Recent prospective controlled studies of adult patients have identified aspects of a medical history and physical examination that correlate well with the presence (and also absence) of ankle or foot fractures. Coined the "Ottawa ankle rules," validated guidelines are derived from many methodologic standards. Because of the current low yield of ankle and foot radiographs—15% of all such x-ray films reveal fractures—the stage is set for reliable and cost-effective management of local ankle and foot trauma.

An ankle radiographic series is always indicated if an interview with the patient elicits a description of pain over the malleoli and also one of the following: inability to bear weight both immediately and on first evaluation by a physician (weight bearing is tested by asking the patient to take four consecutive steps without assistance); bone tenderness on palpation of the distal 6-cm posterior edge (tip) of the medial malleolus; or bone tenderness on palpation of the distal 6-cm posterior edge (tip) of the lateral malleolus. In related studies, this approach has detected all notable ankle fractures, allowing an examiner to forgo radiographs in 34% of patients.

A radiographic series of the foot is always indicated if the interview elicits a subjective complaint of pain in the midfoot zone and also one of the following: inability to bear weight both immediately and on first evaluation by a physician; bone tenderness on palpation of the navicular bone; or bone tenderness on palpation of the base of the fifth metatarsal. In related studies, the potential to reduce the number of foot films is 30% without increasing the chance of missed fractures.

An ankle or foot x-ray film series is also recommended when assessment of a patient is difficult because the patient is intoxicated or has a head injury, multiple painful injuries, or diminished sensation due to a neurologic deficit. Combined with proper follow-up for patients who do not improve within five to seven days, these principles can virtually eliminate the possibility of a missed fracture.

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REFERENCES

Stiell IG, Greenberg GH, McKnight RD, et al: Decision rules for the use of radiography in acute ankle injuries—Refinement and prospective validation. JAMA 1993; 269:1127-1132

Stiell IG, McKnight RD, Greenberg GH, et al: Implementation of the Ottawa ankle rules. JAMA 1994; 271:827-832